

CLAIMS

1. A package for light emitting element comprising:

a package main body having a bottom face on which a light emitting element is arranged and a concave portion formed in an inverted truncated cone shape on an inner wall face intersecting with the bottom face by a predetermined angle; and

a translucent member filled in the concave portion of the package main body; the angle between the inner wall face composing the concave portion and the bottom face is selected within $\pm 15^\circ$ of the incident critical angle in which a direct light radiated from the light emitting element undergoes total reflection at the interface between the translucent member and air.

2. A package for light emitting element according to claim 1, wherein the package main body is composed of resin or ceramic.

3. A package for light emitting element according to claim 2, wherein each of the resin or the ceramic is composed of white resin or white ceramic respectively.

4. A package for light emitting element according to claim 3, wherein the white resin is

composed of polyphthalamide resin or silicone resin.

5. A package for light emitting element according to claim 1, wherein the reflectivity of the inner wall face of the concave portion is 60% or higher.

6. A package for light emitting element according to claim 1, further comprising; on the bottom portion of the concave portion of the package main body a lead frame mounting the light emitting element thereon is buried, a part of the lead frame is exposed by a recess portion formed on the bottom face of the concave portion and on the inner wall face.

7. A package for light emitting element according to claim 6, wherein the package main body is composed of resin or ceramic.

8. A package for light emitting element according to claim 7, wherein each of the resin or the ceramic is composed of white resin or white ceramic respectively.

9. A package for light emitting element according to claim 8, wherein the white resin is composed of polyphthalamide resin or silicone resin.

10. A package for light emitting element according to claim 9, wherein the reflectivity of the inner wall face of the concave portion is 60% or higher.

11. A package for light emitting element comprising:

a package main body where a plurality of peripheral concave portions are formed around a central concave portion in which light emitting element is arranged on the bottom portion; and

a translucent member filled in the central concave portion and the plurality of peripheral concave portions in common,

the central concave portion is composed of a bottom face the light emitting element is arranged thereon, and an inner wall face intersecting with the bottom face with a predetermined angle in an inverted truncated cone shape, the angle between the inner wall face and the bottom face is selected within $\pm 15^\circ$ of the incident critical angle in which a direct light radiated from the light emitting element undergoes total reflection at the interface between the translucent member and air, the angle between the inner wall face of the plurality of peripheral concave portions and the bottom face is set nearly equal to the corresponding angle of the central concave portion.

12. A package for light emitting element according to claim 11, further comprising:

in the plurality of peripheral concave portions, the peripheral concave portions located at a far position from the central concave portion are built to make

the position of the bottom portion higher compared with the peripheral concave portions located at a near position.

13. A package for light emitting element according to claim 11, wherein the plurality of peripheral concave portions are arranged to form a plurality of concentric circles around the central concave portions.

14. A package for light emitting element according to claim 12, wherein the plurality of peripheral concave portions have nearly equal opening diameters and depths, have cross sections formed in nearly inverted cone shape, the bottom portion of the peripheral concave portion arranged on the outer concentric circles are located in a higher position than those arranged on inner concentric circles.

15. A package for light emitting element according to claim 14, wherein the package main body is composed of resin or ceramic.

16. A package for light emitting element according to claim 15, wherein each of the resin or the ceramic is composed of white resin or white ceramic respectively.

17. A package for light emitting element according to claim 16, wherein the white resin is composed of polyphthalamide resin or silicone resin.

18. A package for light emitting element comprising:

a package main body on which a plurality of concentric circular reflecting grooves are formed around a central concave portion a light emitting element is arranged on bottom portion thereof; and

a translucent member filled in the central concave portion and a plurality of reflecting grooves which are formed on the package main body in common; the central concave portion is formed in an inverted truncated cone shape by a bottom face the light emitting element is arranged thereon, and an inner wall face intersecting with the bottom face with a predetermined angle, the angle between the inner wall face and the bottom face is selected within $\pm 15^\circ$ of the incident critical angle in which a direct light radiated from the light emitting element undergoes total reflection at the interface between the translucent member and air, the angles between plurality of inner wall face and the bottom face of the peripheral concave portions are nearly equal to the corresponding angles of the central concave portions.

19. A package for light emitting element according to claim 18, wherein the package main body is composed of resin or ceramic.

20. A package for light emitting element according to claim 19, wherein each of the resin or the ceramic is composed of white resin or white ceramic respectively.

21. A package for light emitting element according to claim 20, wherein the white resin is composed of polyphthalamide resin or silicone resin.

22. A manufacturing method of a package of a light emitting element comprising:

preparing a package main body composed of a bottom face light emitting element is arranged thereon and a concave portion which is formed in an inverted truncated cone shape on an inner wall face intersecting with the bottom face with a predetermined angle;

preparing a translucent member filled in the concave portion; and

selecting the angle between the inner wall face composing the concave portion and the bottom face to be within $\pm 15^\circ$ of the incident critical angle in which a direct light radiated from the light emitting element undergoes total reflection at the interface between the translucent member and air.